What is claimed is:

1. A spin tunnel magnetoresistive effect film comprising at least a structure of lower electrode layer/anti-ferromagnetic thin film/first magnetic thin film/tunnel barrier layer/second magnetic thin film/upper electrode layer , each being successively laminated, wherein an exchange coupling magnetic field of said first magnetic thin film in accordance with said anti-ferromagnetic thin film is Hr, a coercivity of said second magnetic thin film is Hc2, and said Hr and Hc2 satisfy the relationship of Hc2<Hr, said spin tunnel magnetoresistive effect film further comprising an underlayer disposed between said lower electrode layer and said anti-ferromagnetic thin film and made of Ta, Zr, Hf, or an alloy thereof, the average surface height unevenness of said anti-ferromagnetic thin film on said underlayer being in the range from 0.1 to 5 Angstroms.

2. A spin tunnel magnetoresistive effect film according to claim 1, wherein the average surface roughness of said first magnetic thin film is in the range from 0.1 to 5 Angstroms.

3. A spin tunnel magnetoresistive effect film comprising at least a structure of lower electrode layer/anti-ferromagnetic thin film/third magnetic thin film/non-magnetic thin film/fourth magnetic thin film/first magnetic thin film/tunnel barrier layer/second magnetic thin film/upper electrode layer each being successively laminated, wherein said third magnetic thin film and said fourth magnetic thin film are anti-ferromagnetically

coupled via said non-magnetic thin film, and wherein an exchange coupling magnetic field of said first magnetic thin film in accordance with said anti-ferromagnetic thin film is Hr, a coercivity of said second magnetic thin film is Hc2, and said Hr and Hc2 satisfy the relationship of Hc2<Hr, said spin tunnel magnetoresistive effect film further comprising an underlayer disposed between said lower electrode layer and said anti-ferromagnetic thin film and made of Ta, Zr, Hf, or an alloy thereof, the average surface roughness of said anti-ferromagnetic thin film on said underlayer being in the range from 0.1 to 5 Angstroms.

4. A spin tunnel magnetoresistive effect film according to claim 3, wherein the average surface roughness of said first magnetic thin film is in the range from 0.1 to 5 Angstroms.

5. A spin tunnel magnetoresistive effect film comprising at least a structure of lower electrode layer/second magnetic thin film/tunnel barrier layer/first magnetic thin film/anti-ferromagnetic thin film/upper electrode layer each being successively laminated, wherein an exchange coupling magnetic field of said first magnetic thin film in accordance with said anti-ferromagnetic thin film is Hr, a coercivity of said second magnetic thin film is Hc2, and said Hr and Hc2 satisfy the relationship of Hc2<Hr, said spin tunnel magnetoresistive effect film further comprising an underlayer disposed between a said lower electrode layer and a said second magnetic thin film and made of Ta, Zr, Hf, or an alloy thereof, the

average surface roughness of said second magnetic thin film on said underlayer being in the range from 0.1 to 5 Angstroms.

6. A spin tunnel magnetoresistive effect film comprising at least a structure of lower electrode layer/second magnetic thin film/tunnel barrier layer/first magnetic thin film/fourth magnetic thin film/non-magnetic thin film/third magnetic thin film/anti-ferromagnetic thin film/upper electrode layer each being successively laminated, wherein said third magnetic thin film and said fourth magnetic thin film are anti-ferromagnetically coupled via said non-magnetic thin film, and wherein an exchange coupling magnetic field of said first magnetic thin film in accordance with said anti-ferromagnetic thin film is Hr, a coercivity of said second magnetic thin film is Hc2, and said Hr and Hc2 satisfy the relationship of $Hc2<Hr$, said spin tunnel magnetoresistive effect film further comprising an underlayer disposed between a said lower electrode layer and a said second magnetic thin film and made of Ta, Zr, Hf, or an alloy thereof, the average surface roughness of said second magnetic thin film on said underlayer being in the range from 0.1 to 5 Angstroms.

7. A spin tunnel magnetoresistive effect film according to claim 1, wherein said anti-ferromagnetic thin film is made of a member selected from a group consisting of PtMn, PtMn-X (where X is Ru, It, Cr, Fe, Co, Ni, Pd, or Rh), PdMn, and NiMn, or an alloy of two members thereof.

8. A spin tunnel magnetoresistive effect film according to claim 1, wherein the film thickness of said underlayer is in a range from 10 to 100 Angstroms.

9. A spin tunnel magnetoresistive effect film according to claim 1, wherein a said tunnel barrier layer comprises a layer selected from a group consisting of an Al oxide film, an Al nitride film, a Ta oxide film, and an Mg oxide film, or at least two layers of said film selected therefrom.

10. A spin tunnel magnetoresistive effect film according to claim 1, wherein the thickness of a said tunnel barrier layer is in a range from 3 to 12 Angstroms.

11. A spin tunnel magnetoresistive effect film according to claim 1, wherein either said first or said second magnetic thin film is a magnetic film having Ni, Fe, Co, FeCo, NiFe, or NiFeCo as a major constituent component, and wherein the film thickness of said magnetic thin film is in a range from 3 to 100 Angstroms.

12. A spin tunnel magnetoresistive effect film according to claim 1, wherein a film laminated with an amorphous magnetic material and a non-magnetic material and having a shielding effect is used as said lower electrode layer.

13. A spin tunnel magnetoresistive effect film according to claim 12, wherein said amorphous magnetic material is an alloy having CoZr as a major constituent component.

14. A spin tunnel magnetoresistive effect film according to claim 3, wherein said non-magnetic thin film sandwiched between said anti-ferromagnetically coupled third and fourth magnetic thin films is selected from a

group consisting of Ru, Cr, Rh, and Ir, or an alloy comprising at least two members selected from a said group, and further wherein said third magnetic thin film or said fourth magnetic thin film is made either one of Co, FeCo, NiFe, and Nifco.

15. A spin tunnel magnetoresistive effect film according to claim 14, wherein the film thickness of said non-magnetic thin film is in the range from 4 to 10 Angstroms.

16. A spin tunnel magnetoresistive effect film according to claim 1, claim 2, further comprising a Co, Fe, FeCo, or NiFeCo having a thickness in the range from 1 to 20 Angstroms inserted at a boundary between a said tunnel barrier layer and said first magnetic thin film or said second magnetic thin film.

17. A method for manufacturing a spin tunnel magnetoresistive effect film according to claim 1, wherein means for controlling average surface roughness forms a film by introducing gas having oxygen, nitrogen, hydrogen or a gas mixture thereof at a pressure in a range from 10^{-6} Torr to 10^{-9} Torr into a film growing chamber.

18. A method for manufacturing a spin tunnel magnetoresistive effect film according to claim 1, wherein means for controlling average surface roughness forms a film by introducing gas having oxygen, nitrogen, hydrogen or a gas mixture thereof at a pressure in the range from 10^{-7} Torr to 10^{-8} Torr into a film growing chamber.

19. A method for manufacturing a spin tunnel magnetoresistive effect film according to claim 1, wherein means for controlling average surface roughness causes oxidation of a surface of an underlayer made of Ta, Zr, Hf or an alloy thereof.

20. A method for manufacturing a spin tunnel magnetoresistive effect film according to claim 1, wherein means for controlling average surface roughness cools a substrate to a temperature of 0oC or lower during film growth.

21. A method for manufacturing a spin tunnel magnetoresistive effect film according to claim 9, whereby a said tunnel barrier layer is formed by introducing oxygen, nitrogen or a gas that includes an oxygen radical or a nitrogen radical into a vacuum of 10^{-7} Torr to 10^{-10} Torr, and performing either oxidation or nitridation.

22. A method for manufacturing a spin tunnel magnetoresistive effect film according to claim 21, wherein said tunnel barrier layer oxidation or nitridation is performed at a substrate temperature in a range from room temperature to 250oC.

23. A spin tunnel magnetoresistive effect element wherein a magnetoresistive effect film formed in the process according to claim 1, is fabricated into an element so that it has an element height in the range from 0.1 to 1.0 μm and an element width in the range from 0.1 to 1.0 μm, and an element resistance in a range from 40 to 100 Ω.

24. A spin tunnel magnetoresistive effect element according to claim 23, having means for generating a bias magnetic field sufficient to cause single magnetic domains in said second magnetic thin film.

25. A spin tunnel magnetoresistive effect element according to claim 24, wherein said means for generating bias is a permanent magnetic film or anti-ferromagnetic thin film disposed in neighboring contact with said second magnetic thin film.

26. A shielded-type spin tunnel magnetoresistive sensor, comprising a soft magnetic material having shielding effect which sandwiches on top and bottom a spin tunnel magnetoresistive effect element according to claim 23.

27. A yoke-type spin tunnel magnetoresistive sensor in which a signal field is guided to a spin tunnel magnetoresistive effect element according to claim 23 by a soft magnetic material having shield effect.

28. A magnetoresistive detection system comprising a spin tunnel magnetoresistive effect element according to claim 23 and means for detecting a resistance change ratio of said spin tunnel magnetoresistive effect element as a function of a detected magnetic field.

29. A magnetic apparatus comprising a magnetic recording medium onto which information is recorded, a magnetoresistive sensor according to claim 26 which plays back information recorded on said magnetic recording medium, and an actuator for the purpose of controlling movement of said magnetoresistive sensor to a selected position on said magnetic recording medium.